

HAIER

Color Television

Service Manual

PART # AC-8888-04

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Table Of Contents

Contents	2
TN201AUV/TN131AUV Color TV Receiver	3
TN201UV Using Manual	6
TN201AUV Alignment	7
WORKING METHOD OF HIGH VOLTAGE PROTECTION CIRCUIT OF TN201AUV CRT	12

TN201AUV/TN131AUV Color TV Receiver

Technical Notes

I. General information

TN201AUV 21 inch NTSC-M color TV receiver uses the single main chip LA76814, which is controlled by 12C bus, and the CPU chip is LC86F3348. This type of machine provides CCD and V-CHIP function and many other expended function, and enables high performance on the single PCB motherboard.

II. Major technical data:

1. Frequency compound digital turning;
2. All channel CATV, AIRTU receiving;

Band	AIRTU Channels	CATV Channels	Channel Range (MHz)
L	2~6	2~6,A-5~A~3,A-2~B	55.25~127.25
M	7~13	C~KK	133.25~361.25
H	14~69	LL~125	367.25~801.25

3. Preset 125 Channels;
4. NTSC-M system;
5. CCD and V-CHIP function;
6. Built-in AV input socket in the front panel;
7. Full-function infrared remote control;
8. English/ French/Spanish on screen display;
9. Eight background color and foreground color;
10. Direct program selector, program recall, program up/ down (skip programs which are set 'MEMORY=OFF');
11. Brightness, contrast, tint, sharpness, color and volume 64-steps control through 12c bus;
12. Timer on/off, sleep off mode, power on/off and blank signal 10-minutes Auto-off;
13. Mute, blank signal auto-mute, auto-mute for programs which are set 'MEMORY=OFF', and automatic search;
14. Max. Audio output power large than 3w+3w;
15. MTBF lowest limit not large than 20,000 hours;
16. Power input 50/60Hz, 120±20V Ac;
17. Antenna input resistance: 75Ω (non-balanced style);
18. Screen size: 54cm (flat square angle tube);
19. Max. Power consumption: not more than 75W (120V AC/60Hz);
20. Dimensions: 495X460X460.5 (mm);
21. Weight: app. 21Kg.

III Circuit working principle and functions:

1. Integrated circuit chip LA76814
 - a) This chip was created by SANYO in 1999. It is a NTSC-M system chip that integrated audio demodulator, filter, trap filter with the brightness delay line color decoder intermediate frequency filter. It is a highly integrated chip and yet has a well stability thus it requires less outer components for a color TV receiver. It also has the advance functions

of LA7687 and LA7688. It's a powerful chip and could be used in a wide range of circuits.

- b) This chip can accomplish the following tasks: graphic audio intermediate frequency amplifying, graphic demodulation, accompany audio intermediate frequency amplifying, graphic demodulation, video amplifying, color decoding and work as a frame and line pulsate. Graphic demodulation, accompany audio demodulation, and color decoding are done with PLL phase lock demodulation, thus raised the stability and reliability with great scale and black level extension function. Bus geometry graphic regulation and 12C bus control function is added to this chip on base of LA7687. The graphic performance is highly improved.
 - c) The field output circuit is SANYO LA7840 frame output circuit chip, which is specially designed for bus-controlled color TV Receiver. The advantage of this chip is a large output current with less outer component required. The retrace is done under the pump function of power supply. Through connecting with LA76814, it can accomplish the frame range, frame center, frame linear and frame S regulation controlled under 12C bus.
2. The power supply system of this model is a frequenting floating parallel switch voltage stabilizer circuit. It can carry out pulsate and switch output function. The circuit is a simple and stable one with a thorough protection system. In order to maintain a stable output voltage and to raise the power reaction speed, the circuit opts a feed voltage stabilizing control system-pick the main power supply and test it with a highly sensitive stabilizing test circuit and send the test result back. Then through the optical-electronic coupling, to the pilaster circuit and finally works to decide the on/off of the switch regulator tube after it has been regulated and amplified. It's an efficient way to get a fine control and a fast power supply reaction and the stability of the output voltage also improved. Further more, using the optical-electronic coupling in handling the DC feedback Signal is a safe function for it separates the primary and secondary output.
2. The video amplifying output circuit incorporates a simple but efficient wide band amplifying circuit with a wide frequency band and high gain (RGB output range is beyond 100Vp-p). You can adjust the vertical and horizontal character during the compensation procedure of the amplifier's range frequency character by adjusting the resistor parallel and series to the capacitance to ensure a proper compensation.
3. The audio signal, after demodulated by LA76814, is switched with the outer audio Input signal through the audio switch output from the 1st pin. This machine incorporates LA4225A, small, high signal/noise ratio, and high power output. It can out put audio signal over 3w+3w.
4. CPU adopted for this machine is LC86F3348A, CCD and V-CHIP function enabled. 248 x 18 x 34 matrix OSD, 8 foregrounds and background color. The incorporation with al frequency 32.768KHz crystal pilaster and PLL phase lock technique results in lowest EMI. It can be connected to 3-bus control chips.

IV. Notes for using the machine

1. Please read and remember the contents of the user's manual and the warnings on the back cover of TV set carefully before using the machine, especially the safety instructions.
2. Keep the set away from heaters, ovens or such heating equipment.
3. Keep well ventilated.
4. Away from heavy dust and corrosive gas.
5. Not exposed to rain or mixture.
6. Away from strong magnetic object.
7. Don't move the machine while it's on. Please do it after your have cut off the power.
8. Remove the outdoor antenna connection during thundering weather.
9. Remove the power plug from the socket for long-term power failure or absence.

TN201UV Using Manual

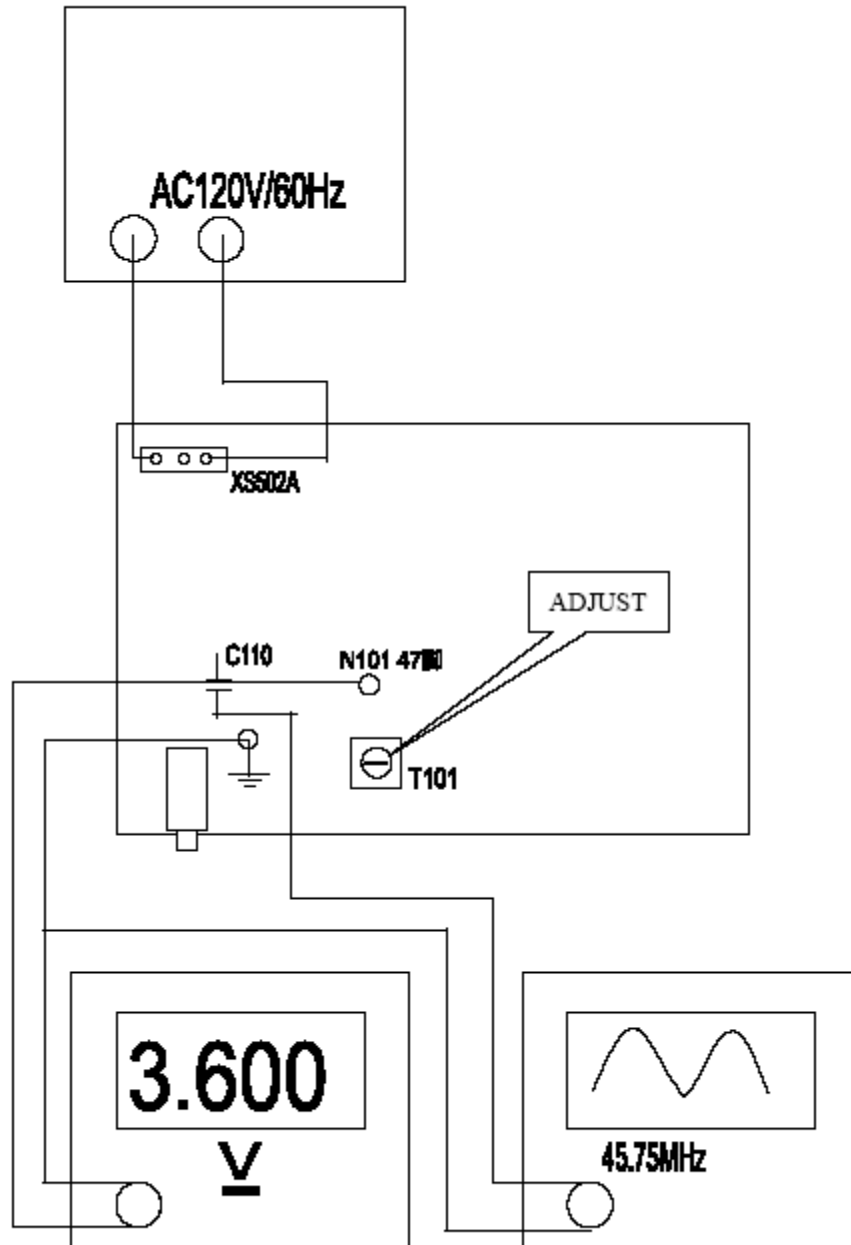
Connect the power plug to power socket (AC120V), connect the signal source, press the power button, the red power indicator comes on. For the following operations, follow the instructions:

- I. Graphic menu
Press 'MENU' to call out the menu, press 'CH+' or 'CH-' to call out 'VIDEO' subdirectory, select the 'CONTRAST', 'BRIGHT', 'COLOR', 'SHARP', 'TINT' options, and press 'VOLUME+' or 'VOLUME-' to adjust the above items.
- II. Clock menu
Press 'MENU' to call out the menu, press 'CH+' or 'CH-' to call out 'TIME' subdirectory, select the 'CLOCK', 'ON TIME', 'OFF TIME', 'SLEEP', 'CHANNEL' Options, set timer on on/off time, sleep mode time and timer on channel.
- III. System menu
Press 'MENU' to call out the menu, press 'CH+' or 'CH-' to call out 'SETUP' subdirectory, select the 'LANGUAGE', 'RECEPTION AIR', 'AUTO PROGRAM', 'ADD/ DELETE', 'INPUT TV', options, by pressing 'VOL+' and 'VOL-', you can change the on screen display, receiving method (CATV/AIR), auto program search, add/delete program and switching between TV and AV input method.
- IV. Specialized settings:
Press 'MENU' to call out the menu, press 'CH+' or 'CH-' to call out 'SPECIAL' subdirectory, select the 'C CAPTION', 'CCON MUTE', 'POWER RESTORE', 'AUTO TINT', 'MENU OFFSET', 'MENU B G C' options, use 'VOL+' to change the CCD method, and decide whether to display the CCD signal when mute, whether to standby on power connection, whether to use auto tint demodulation, or you can change the on screen position of the menu and the background color.
- V. V-CHIP:
Press 'V-CHIP' to call out the 'V-CHIP' menu, use the 'CH-' to select 'TV RATING', 'MPAA RATING', 'BLOCK IN', 'OPTION MENU' items, and press 'MENU' to call out the options menu, use 'CH+', 'CH-' 'VOL+', 'VOL-' to the settings.
- VI. Volume
Press 'VOL+' and 'VOL-' to adjust the volume.
- VII. Other function keys on the remote controller:
 1. 'TV/AV' key, switch between TV and AV method.
 2. 'ON/OFF' key, by pressing this key, switch the TV set between standby mode and on mode.
 3. 'RECALL' key, recall the last program, one more operation to return to the present one
 4. 'MUTE' key, mute function key.
- VIII. Keys and buttons on the set:
 1. 'CH+' and 'CH-', press to select channel;
 2. 'VOL+' and 'VOL-', press to adjust volume;
 3. 'MENU', press to call out the main menu, use 'CH+', 'CH-', 'VOL+' and 'VOL-' to set the items within this menu;
 4. 'TV/AV' key, switch between TV and AV method.

TN201AUV Alignment

The alignment and test processes should be taken under the standard NTSC-M audio and video conditions, and there should be V-CHIP and CCD contents in the test signal.

- If alignment:
 1. Test equipments:
 - a. 45.75MHz sweep generator
 - b. AC 120V/60Hz power supply (with short and over current proof)
 - c. Digital multimode
 2. Alignment
 - a. Connect position pen of digital multimode to 47 pin of N101 on main PCB:
 - b. Connect 45.75MHz sweep generator to test top between W108 and C110:
 - c. Connect 120V/60Hz power supply to outlet XS502A.
 - d. Adjust T101 and make digital multimode display 3.6V.



- Adjusting focusing voltage and raster voltage:
 1. Input white field signal, press 'SCAN' key of the alignment remote controller to turn the raster to a bright line. Adjust the potential regulator of FBT to turn down the line to just visible, press the 'SCAN' key again.
 2. Input digital figure signal (5-circle figure), find and tune the focusing potential regulator on the FBT to gain the best display effect.
- Vertical and horizontal scan adjustment:
 1. Input digital figure signal (5-circle figure);
 2. Press 'GEO' key of the alignment remote controller to call out the scan parameter menu as follows:

OSD	DESCRIPTION	RANGE	REFERENCE
H.PHASE	Horizontal phase	0-30	16-17
V.POSI	Frame center	0-63	48
V.SIZE	Frame range	0-127	80
NO SO POWER OFF	Blank signal auto-off	Yes/No	Yes
V SC	Fram s adjustment	0-31	8
VLIN	Fram linear adjustment	0-31	10
Note: Use the 'p+' and 'P-' to move the cursor to select a certain item; the selected item is highlighted with red while other unselected remain green. Use 'V+' and 'V-' to change the parameter of the selected item.			

1. Press the 'PICTURE' key of the alignment remote controller again to save the change parameter.

II. Factory configuration setting:

Press 'PROD' key to enter the first page of the main menu of factory configuration. There are 14 items under this menu; there are 6 more items listed below:

OSD	Description	Range	Reference
CTTST	Test control	0-1	0
HFREQ	Horizontal frequency 0	0-63	29
VSPUP	Field simultaneous sensitivity 0=High, 1=Low	0-1	0
GMODE	Gray mode, 0=100%, 1=50%	0-1	0
V-LIN	Fram linear (set in GEO)	0-31	10
RGDEF	R.G output compensation	0-1	0
BGSLC	B output compensation	0-3	0
AFG&G	AFC gain 0=high 1=low	0-1	0
OSCNT	OSD signal gain	0-3	2
CBYPS	Set the intermediate frequency parameter of Internal tint band-pass filter	0-1	0

CRB/W	Test mode: 0=normal, 1=dark field, 2=bright field 3=cross figure signal	0-3	0
HBLKL	Left blanking	0-7	0
HBLKR	Right blanking	0-7	0
BSHLD	ABL door limit	0-7	3-4
EMABL	Emergency ABL remove switch:0=on, 1=off	0-1	0
MDSTP	Use brightness to release ABL, 0=off, 1=on	0-1	0
FMLBL	FM output accuracy	031	16
BRABL	Brightness ABL switch 0=off, 1=on	0-1	1
VDLBL	Video demodulation output range 0=small, 1=large	0-7	7
PASSW	V-CHIP function 0=OFF, 1=ON	0-1	1

3. Simulation preset

- 1) Input color bar signal;
- 2) Press 'MENU' key, set color, contrast, color saturation, tint at medium position;
- 3) Press 'DP' key of the alignment remote controller to call out the menu which contains the following items:

OSD	Description	Range	Reference
Sub brightness	Preset brightness	0-127	60
Contrast	Preset contrast	0-27	27
Tint	Preset tint	0-77	35
Color	Preset color saturation	0-27	14

- 4) When done, press 'PICTURE' to save the result.

III. Adjust the white level:

- 1) Press 'GEO' of alignment remote controller, set the item 'NO SD POWER OFF YES' to 'NO', keep the TV power on for over 30 minutes:
- 2) Degauss the CRT:
- 3) Input bright field signal through AV channel:
- 4) Connect white level test equipment to the set:
- 5) Press 'W/B' key of the alignment remote controller to call out the following menu:

OSD	Description	Range	Reference
RD	Red stimulate potential	0-127	64
GD	Green stimulate potential	0-15	7
BD	Blue stimulate potential	0-127	64
RB	Red stop potential	0-255	Preset 127,adjust 127

GB	Green stop potential	0-255	Preset 127,adjust 250
BB	Blue stop potential	0-255	Preset 127,adjust 220

Set the above items to medium position and then press 'SCAN', adjust the Raster potential regulator until the bright line on the screen turns to a dark line, which is just visible.

Adjust using the following keys until the line turns white {1 (RB+) /2 (RB) 3 (GB-) 5 (BB+) /6 (BB-)}, and then press 'SCAN' again, use the alignment remote controller 'V+', 'V-', 'P+', 'P-' to adjust 'RD', 'GD' and 'BD' until the whole screen turns white.

- 6) If white level test equipment is available, adjust the above until a proper effect is gained.
- 7) Press 'PICTURE' to save the results:
- 8) Press 'GEO' key, set back the 'NO SD POWER OFF' item to yes.

IV. Inter signal check:

Press the 'PIRN' key on the alignment remote controller to generate Internal signal check:

V. Audio check:

- 1) Input graphic signal with 1KHz audio signal:
- 2) Connect the oscillograph to the speaker input line:
- 3) Press 'V+' key to reach the max volume, the 1KHz should not distort, and the audio should be fine and does not interfere the video signal.
- 4) The tested non-distort output power should be less than 2W.

VI. Check with the keys on the set

Please refer to the user's manual.

VII. Check of the front AV input channel function:

Input AV signal, check the audio and video function.

IX. V-CHIP, CCD function

- 1) Press 'V-CHIP' to call out the V-CHIP menu, check the V-CHIP function
- 2) Press the 'MENU' key and enter 'CCAPTION' item menu, check the CCD Function.

X. Voltage resistance and insulation utility test:

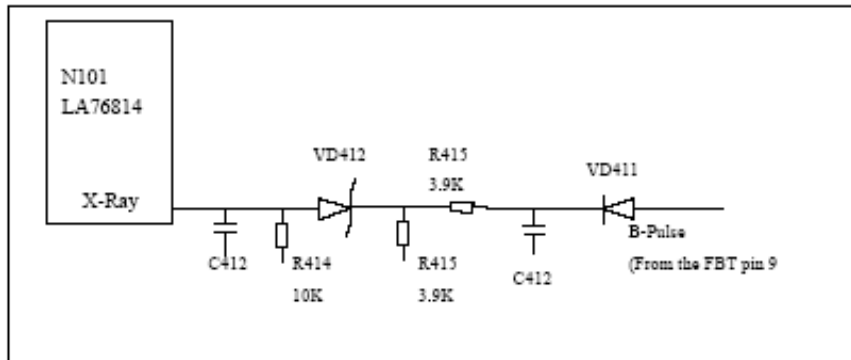
Input 1500V 1mA for 1sec; make that no component is broken.

WORKING METHOD OF HIGH VOLTAGE PROTECTION CIRCUIT OF TN201AUV CRT

1. The working method

The electrical level masters the high voltage control system of this model of the 34th pin of the main decoding chip—LA76814, when the 34th pin output High voltage, LA76814 cuts the line square-wave output on 27th pin, thus the line triode V432 holds, and the line output amplifier stops and generate no more high voltages. This process is divided by R412 and R416. If the divided potential still can break the stabilizer diode VD12, it will direct the work on the LA76814 and raise the potential on its 34th pin, thus run the high voltage protection process. The time constant function by C412 and R414 will give a delay to the high voltage protection circuit.

Diagram as follows:



II. List of components that decides the X-ray generation

No.	Description	Model	Origination
U901	CRT	54SX503-Y22	IRICO
N101	I.C	LA76814	SANYO
V431	Triode	2SC2383-O	No.4 E-Component Firm, FoShan
T431	H. Drive Amp.	JDT1904	Jingshi, Shenzhen
V432	Triode	2SD1651-CTV-YB	No.4 E-Component Firm, FoShan
C436	H. Volt. ceramic capacitor	CT81-2R-2KV-470PF-K	Hongming, Dongguan
T471	H. Output Amp.	JF0510-191129	Jingshi, Shenzhen

R471	Cement resistor	RX27-5W-3.9Ω-J	Xinyang, Jiangsu
R434	Oxide film resistor	RY17-2W-3.3KΩ±5%	Yongxing, Sichuan
R412	Carbon film resistor	RY13-1/6W-8.2KΩ±5%	No.6 Component electro. Firm, Zibo
VD412	Stabilizer diode	H27L1/KEL-7V5B1	Electronic factory, Leshan
VD551	Regulator diode	EU3A/RU3A	Electronic factory, Leshan

III. Key components which decides the X-ray generation:

NO.	Description	Model	Short	Open
N101	IC	LA76814	When LA76814 is idle, it is to say no square-wave generates from the 27th pin of N101, no high potential will generate and no X-ray exists.	
V431	Triode	2SC2383-O	When short B and E, the square-wave will no more work on T471. If short B, C, the square-wave will not get amplified. No high potential will generate, and no X-ray exists.	Cut the line output square-wave, T471 does not work, no high potential generate and no X-ray exists.
T431	Line drive amplifier	JDT1904	Square-wave will not reach T471, T471 does not work no high potential generate and no X-ray exists.	
V432	Triode	2SD1651-CTV-YB	When short B and E, the square-wave will no more work on T471. If short B, C, the square-wave will not get amplified. No high potential will generate, and no X-ray exists.	If V432 is open, no switch signal will generate, T471 does not work, no high potential generate and no X-ray exists.
C436	High-voltage ceramic	CT81-2R-2KV-470P F-K	Output square-wave will not arrive T471, T471 does not	Reduces the high potential generated by T471 by means

	capacitor		work, no high potential generate and no X-ray exists.	of enlarging the reverse capacity, does not take effect on the X-ray.
T471	Line output amplifier	JF0510-191129	When T471 does not work, no high potential generate and no X-ray exists.	
R471	Cement resistance	RX27-5W-3.9Ω-J	The potential on the collector anode of V432 is raised and its static working point is changed, which make the potential output of T471 rise and possibly will generate X-ray.	No bias level on V432, no switch signal outputs from V432, T471 does not work, no high potential generate and no X-ray exists.
R434	Oxide film resistance	RY17-2W-3.3KΩ±5%	The potential on the collector anode of V431 is raised and the static working point is changed, which make the potential output of T471 rise and possibly will generate X-ray.	No bias level on V432, no switch signal outputs from V432, T471 does not work, no high potential generate and no X-ray exists.
R412	Carbon film resistance	RY13-1/6W-8.2KΩ±5%	When shorted, the voltage feedback from the 9th winding of T471 will not get divided, thus make VD412 more easier get PENETRATED and the X-ray production circuit more easier to start.	The feedback voltage from the 9th winding of T471 will never PENETRATE VD412, the X-ray protection circuit will not start. There might be X-ray generated.
VD412	Voltage stabilizer diode	H27L1/KEL-7V5B1	Same as r412	Same as r412
VD551	Current Regulator Diode	EU3A/RU3A	Will not regulate the AC output current from the 9th winding of T511 and let it go	No main voltage exists, no X-ray will generate.

			through VD511, C561 and directly discharge to the ground, thus, main voltage will not exist, no X-ray will generate.	
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